

## Species

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# A rare rendezvous: Albino spotted deer and swamp deer in the Chitwan National Park, Nepal

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## ABSTRACT

The Chital or spotted deer (*Axis axis*), classified as a species of least concern, is found in various habitats, notably in moist and dry deciduous forest areas, short grasslands in the terai, swampy meadows, mixed forests, or plantation regions. Similarly, Barasingha or swamp deer (*Rucervus duvaucelii*) are large herbivores dwelling in grasslands, primarily feeding on grasses and aquatic plants, with a strong preference for short grasslands. The presence of swamp deer was initially noted in Chitwan National Park (CNP) during the 1960s. However, it was later declared extinct in the park. In an effort to revive this species, the park initiated a reintroduction program by introducing seven swamp deer into the Padampur grassland in CNP from Shuklaphanta National Park in 2017. This study highlights two intriguing cases observed in the same location within CNP. First, the observation of an albino spotted deer, and the second is an untracked female swamp deer reintroduced to CNP. Understanding that albinism is a rare and complex phenomenon in wildlife, the stark coloration lacking protective camouflage, and impaired vision significantly reduce the survival rate of albinos, contributing to their low proportion within the population. In the case of swamp deer, the adaptability displayed by the lone survivor challenges the preconceived notions about species-specific translocation requirements. Nevertheless, observing swamp deer thrive not only within their own herds but also within mixed herds of different species opens up new avenues for future research and management.

**Keywords:** Albino, Chital, Swamp deer, Chitwan National Park, Re-introduction, Translocation

## 1. INTRODUCTION

Belonging to the Cervidae family, the Chital (*Axis axis*, Erxleben, 1777), also known as spotted deer, thrives in a variety of habitats, particularly, moist and dry deciduous forest areas, short grasslands in the terai, swampy meadows, mixed forests, or plantations region. Chital is particularly frequent in grassland–forest interfaces, edges, and other ecotones. It is categorized as the least concern species in the IUCN Red List because it occurs over a very wide range within which there are many large

subpopulations. Chital are native to Bangladesh, Bhutan, India, and Nepal (Duckworth et al., 2015). Kumar, (2010) found that well-watered and well-protected moist deciduous forest patches in gently undulating terrain support high Chital densities. Chitals are the preferred prey species of tiger (*Panthera tigris*). Schaller, (1967) argued that Chital's distribution is determined by the need for water, shade, avoidance of high rugged terrain and preference for grass as forage.

Swamp deer (*Rucervus duvaucelii*) commonly referred as Barasingha are large grassland dwelling herbivores predominantly feeding on grasses and aquatic plants, with a strong preference for short grasslands (Pokharel, 1996). Their diet mainly consists of *Saccharum* spp., *Narenga porphyrocoma*, *Cynodon dactylon*, *Imperata cylindrica*, *Oryza rufopogon*, and *Phragmites karka*. Groves, (1982) recognized three sub-species of swamp deer i.e., the hard ground Barasingha (*Rucervus duvaucelii branderi*), the eastern subspecies (*Rucervus duvaucelii ranjitsinhi*), and the prevalent northern subspecies (*Rucervus duvaucelii duvauceli*), often referred to as swamp deer. This northern subspecies (hereafter swamp deer), making up 80% of the global population, is predominantly found in the northern Indo-Gangetic plain, covering Nepal and parts of India (Qureshi et al., 2004; Dhimi et al., 2023a). The herds typically consist of about 8–20 individuals, occasionally forming larger groups of up to 60.

Historically, this subspecies was well distributed throughout the swampy grasslands of tropical lowlands (Terai) of Nepal including Chitwan National Park (CNP). However, the last surviving population of swamp deer is now restricted to the pocket areas of Bardia National Park (BNP) and Shuklaphanta National Park (ShNP), with an estimate of 2325 individuals (DNPWC, 2020; Dhimi et al., 2023b). Recognizing the critical need for conservation of this species Government of Nepal translocated six swamp deer to BNP in 2016 and seven individuals to CNP from ShNP in 2017. Additionally, legal provisions for the protection of swamp deer are outlined in the NPWC (National Parks and Wildlife Conservation) Act of 2029 which regulates to deter poaching activities through imposing stringent penalties such as individuals involved in the poaching of swamp deer may face imprisonment ranging from 5 to 15 years or a fine of 5 to 10 lakh Nepalese rupees, or both.

On the other side, informants will receive a reward up to 50,000 Nepalese rupees as recognition for their assistance in curbing illegal activities and protecting swamp deer. According to the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) classification, Swamp deer is categorized as CITES Appendix I, signifying its high level of protection. Additionally, the IUCN Red List designates swamp deer as an vulnerable species (Duckworth et al., 2015). Albinos, characterized by their inability to produce color pigments in their skin, hair, feathers, scales, or eyes, exhibit a distinctive white appearance with red or pink eyes (Fertl, 2002). The latter occurs due to the visibility of tiny blood vessels that are normally concealed by the colored iris, which is transparent in albinos.

In the realm of wildlife, albinism is a rare condition present at birth, often caused by a recessive gene (Owen and Skimmings, 1992). The occurrence rate in wildlife is estimated to range from 1 in 20,000 to 1 in 1 million individuals. The solid white coat of fur in albinos renders them more susceptible to predation, as they lack the natural camouflage of their colored counterparts (Uieda, 2000). Conversely, an albino predator may find it challenging to stalk prey effectively due to its conspicuous appearance. In addition to their distinctive appearance, albinos commonly exhibit poor vision or may even be blind (Heiduschka and Schraermeyer, 2008). The combination of a stark coloration that lacks protective camouflage and impaired vision significantly reduces the survival rate of albinos, contributing to their low proportion within the population.

## 2. REINTRODUCTION OF SWAMP DEER IN CHITWAN NATIONAL PARK

Swamp deer was initially observed in CNP during the 1960s; however, it was later declared extinct in the park. In an effort to revive this species, the park undertook a reintroduction initiative by introducing swamp deer into the grassland of Padampur. The chosen location was the same enclosure where the Arna (Asiatic wild water buffalo) were kept. The enclosure spanned an area of approximately 30 hectares, with dimensions of 643 meters in length (East-West), 336 meters in the North, and 300 meters in the South. The enclosure was secured with a concrete foundation and mesh wire, supplemented with solar fencing around its entire perimeter. The translocation process commenced on April 26, 2017 and concluded on May 2, 2017. The following is a summary of the translocated swamp deer (Table 1).

Table 1 Translocated swamp deer

S.N	Year	From	To	Sex		Total
				Male	Female	
1.	2017	Shuklaphanta National Park	Chitwan National Park	2	5	7
	Total			2	5	7

(Source: DNPWC, 2017)

Study area

CNP is a UNESCO world heritage site declared on 1984 spanning 952.63 sq. km in south-central Nepal within the subtropical lowlands of the inner Terai. A significant milestone occurred in 1973 when the area was officially gazetted as Nepal's inaugural national park, recognizing its unparalleled ecosystems of international significance. The Chitwan valley boasts a diverse landscape comprising tropical and subtropical forests, with a predominant coverage of Sal (*Shorea robusta*) forests accounting for 70 percent of the park. Additionally, grasslands occupy less than 10 percent of the park, featuring a rich variety of more than 50 types of grasses, with the elephant grass (*Saccharum spp.*) standing out for its remarkable height, reaching up to 8 meters.

The park's biodiversity is striking, encompassing over 70 mammal species, an impressive array of more than 546 bird species, and a diverse collection of 55 amphibians and 47 reptiles species. Among the notable endangered fauna inhabiting the park are the Greater One-horned rhinoceros, Gaur, Royal Bengal tiger, and Wild elephant. This abundance of wildlife underscores the ecological significance and richness of the Chitwan valley, making it a vital conservation area for various threatened species. The buffer zone of CNP comprises 729.37 sq. km. incorporating forests, private lands, and cultivated areas (CNP, 2022).

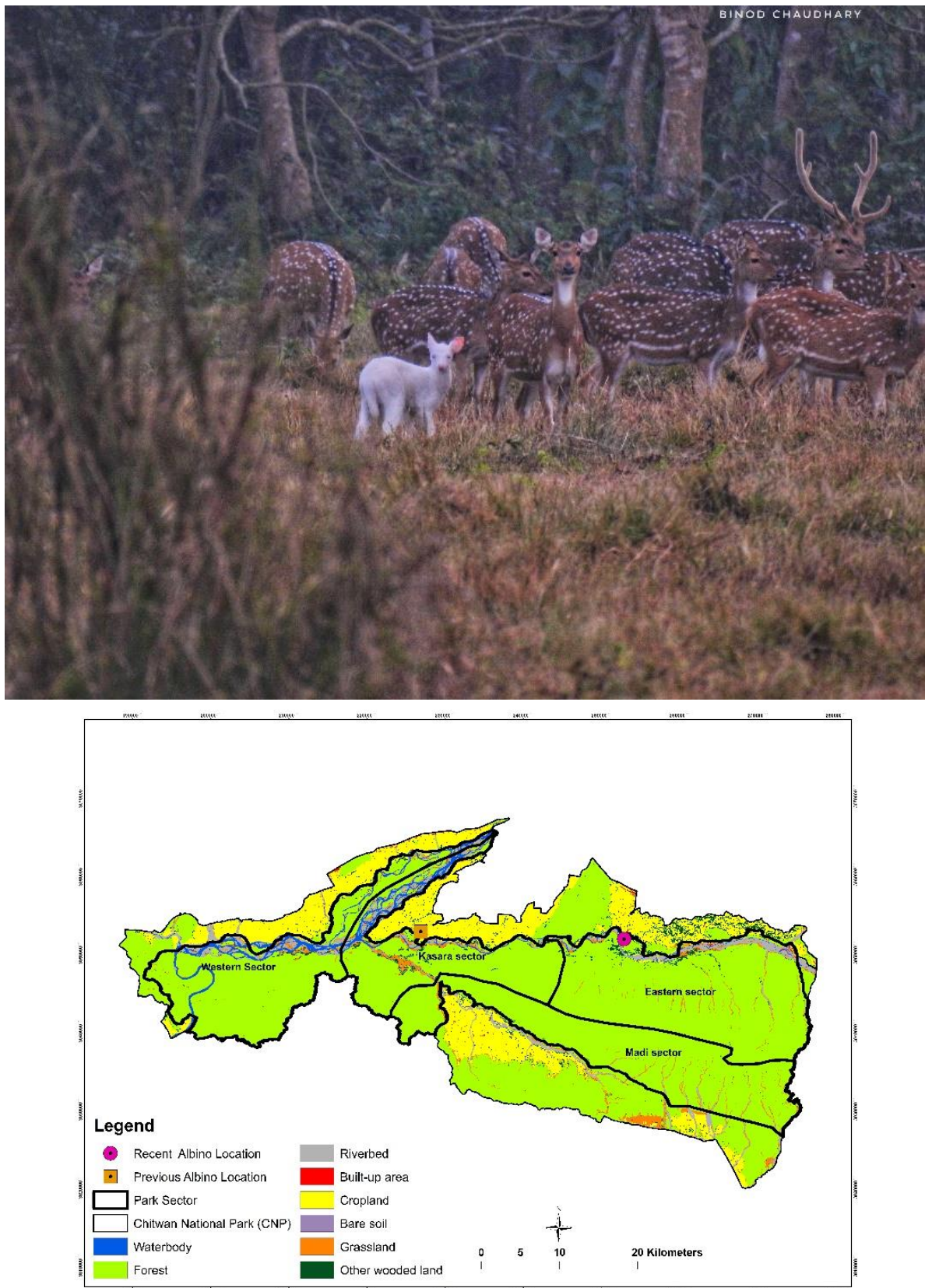
3. RESULTS AND DISCUSSION

Albino spotted deer

Albinism is a rare occurrence, and its documentation is infrequent. In Nepal, Pathak et al., (2023) documented the first case of albino spotted deer in CNP, while Kadariya et al., (2023) recorded the albino spotted deer in BNP. This study documents the second observation of albino spotted deer in CNP on December 31, 2023 around 4:45 PM NPT (Figure 1a). The albino fawn was cared and accompanied by the herd. Previously, the first albino recorded was found dead due to the feral dogs attack in the buffer zone community forest of the Megghauli region (Kasara sector) of CNP (Figure 1b).

Re-introduced Swamp deer

The translocation of seven individuals to CNP from ShNP in 2017 (Figure 2) aimed to bolster the dwindling populations and reestablish a sustainable presence in these areas. However, the challenges faced during these efforts were considerable, with officials recovering the bodies of six of the translocated individuals in CNP. Regrettably, the lone survivor's body remained unrecovered and was presumed dead underscoring the setbacks inherent in traditional translocation approaches. A surprising turn in the narrative emerged when observations revealed the lone survivor's presence within a herd of spotted deer (Figure 3), which also comprises the albino spotted deer fawn, approximately 3 km north of the re-introduced enclosure across the Rapti river towards the buffer zone of Sauraha (Eastern) sector in CNP (Figure 4).



**Figure 1** a) An albino spotted deer fawn with the herd which also possess the re-introduced swamp deer (Photo by: ©Binod Chaudhary), b) Map showing the location of albino spotted deer in CNP, i.e recent albino location refers this study's observation and previous albino location to first photographic record in January, 2020.





**Figure 2** Swamp deer re-introduction program: a) Preparing “Khabar” i.e., traditional handmade net to capture the swamp deer, b) Khabar placed in the field, c) Captured swamp deer moved to the translocation vehicle, d) Swamp deer released in CNP. (Photos by: ©Abhinaya Pathak/DNPWC)

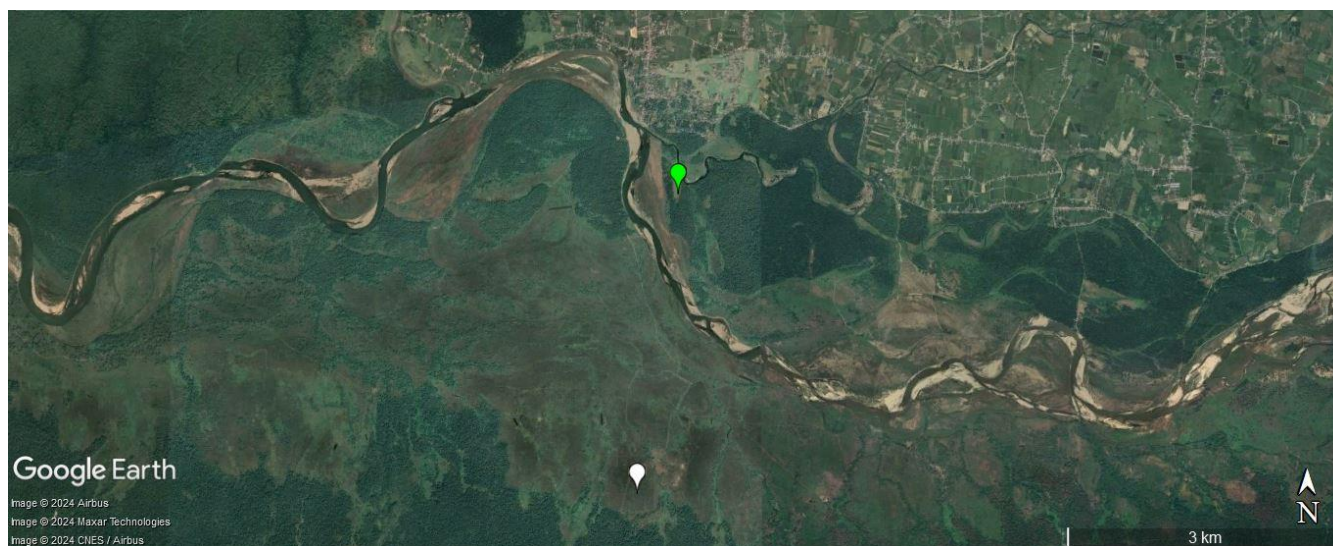
This unforeseen adaptation within a different species' herd is a testament to the remarkable resilience of swamp deer in the face of adversity. The adaptability displayed by the lone survivor which has already lived more than six years since its re-introduction in CNP challenges our preconceived notions about species-specific translocation requirements. It beckons us to reassess the conventional "soft release" method, which involves extended enclosure rearing, as it may not align with the dynamic needs of swamp deer. Further, the financial aspect of the enclosure rearing is also a major challenge for the re-introduction program. In the wild, adaptability is the currency of survival, and the lone survivor's ability to navigate the challenges of a new environment by seamlessly integrating into a different herd underscores the inherent strength of the species.

This adaptability trait should be at the forefront of our conservation strategies. Recognizing that the swamp deer can thrive not only within their own herds but also within mixed herds of different species opens up new avenues for future research and management. Propelling beyond traditional approaches, the future trajectory of swamp deer conservation could pivot towards a direct translocation approach, involving the relocation of viable herds into the wild with minimal enclosure stay, thus mitigating the extended period of enclosure rearing. This approach embraces the species' need for swift adaptation to their natural habitat and acknowledges the importance of allowing them to develop the necessary skills and instincts for survival. Nevertheless, to ensure the effectiveness of the re-introduction program, it is crucial to have proper tracking (i.e., GPS satellite/radio telemetry) and effective monitoring mechanism to comprehensively assess their status, movement and behavior.





**Figure 3** A re-introduced female swamp deer was observed grazing with the herd of spotted deer in CNP. (Photo: ©Binod Chaudhary)



**Figure 4** The white point is the location of enclosure where the swamp deer was released during the re-introduction program, while the green point shows the recent observation of swamp deer in CNP.

#### 4. CONCLUSION

A rare rendezvous between the albino spotted deer and re-introduced swamp deer, an enchanting encounter that unfolded in the lush landscapes of CNP can be interpreted in different ways and with the meager evidence reported in this article there is no point of making any conclusions. However, it is understandable that albinism is the rare and complex phenomenon in a wildlife. It forges the less survival rate and represents the genetic disorder in a wildlife. In case of swamp deer, the lessons learned from the failed attempt highlights the need for adaptive re-introduction and conservation strategies.

The authorities may consider re-visiting the existing translocation methods, taking into account the behavior, ecology, natural instincts of swamp deer alongside reducing the stress level in all the phases of translocation (such as upgrading the conventional

capture method in which swamp deer directly hits the “*Khabar*” when they are chased and cornered for capture, appropriate transportation medium to facilitate long drive from ShNP to CNP, cozy transportation cage, favorable season or weather condition during the translocation operation, etc.) to enhance the chances of successful reintroduction and long-term population establishment in CNP.

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### Conflicts of interests:

The authors declare that there are no conflicts of interests.

### Funding:

The study has not received any external funding.

### Ethical approval

The ethical guidelines for plants & plant materials are followed in the study for species collection & identification.

### Data and materials availability

All data associated with this study are present in the paper.

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